

**REMARKS**

Claims 1, 4, 8, 14, 15, 18, 22 and 28-29 are pending in this application. An amendment to the Abstract is proposed.

**General comments:**

The composition of the present invention is obtained by kneading a polyvinyl alcohol type polymer as a substrate for sustained-releasing with cetyl pyridinium chloride as an anti-protista substance in a polar solvent, melting under heating, and drying (specification: page 6, line 28, to page 7, line 12). As a result, an anti-protista substance is physically fixed (carried) in a substrate for sustained-releasing. By fixing (carrying) physically, the composition of the present invention is not influenced by ions or compounds dissolved in water, such as waste water, and is not decomposed. Thus, the composition of the present invention can retain the sustained-releasing effect of the anti-protista substance for a long time.

**The Abstract of the Disclosure is objected to because of the inclusion of legal phraseology such as “comprising”. Correction is required.**

The objection is overcome by the amendment to the Abstract, in which “comprising” is amended to –including–.

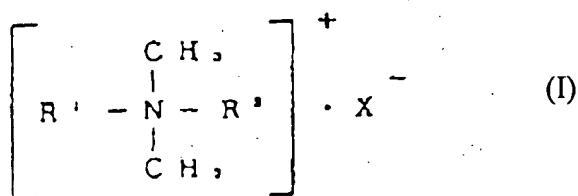
U.S. Patent Application Serial No. 09/839,357  
Reply to OA dated November 3, 2004

Claims 1, 4, 8, 14, 22 and 28-29 are rejected under 35 USC §103(a) as being unpatentable over Akinari et al. (JP 11-246309) in view of Cardarelli (U.S. Patent No. 4,400,374) and Vaughn et al. (U.S. Patent No. 5,006,267).

The rejection of claims 1, 4, 8, 14, 22 and 28-29 is respectfully traversed, and reconsideration of the rejection is requested.

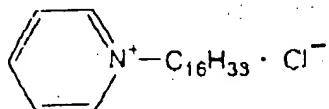
The Examiner states that Akinari et al. teaches a sustained-release waterway treating composition comprising polyvinyl alcohol (PVA) and biocide that is a quaternary ammonium compound.

However, the quaternary ammonium as a biocide in Akinari et al. is shown by following general formula [I] (see the abstract)



(In the formula, R<sup>1</sup> and R<sup>2</sup> are same or different and are C<sub>5</sub>-C<sub>12</sub> alkyl group. X is halogen atom.)

However, cetyl pyridinium chloride has the following structure,



and is not a quaternary ammonium compound by this definition.

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Furthermore, the purpose of using cetyl pyridinium chloride in the present invention is different from the purpose of using the quaternary ammonium in Akinari et al. That is, cetyl pyridinium chloride is used for preventing propagation of protistas such as fungi, algae as well as propagation of bacteria, but the quaternary ammonium in Akinari et al. is used for preventing propagation of bacteria such as iron bacteria, sulfate reducing bacteria, and there is no information in Akinari as to whether the quaternary ammonium has an ability to prevent propagation of fungi and algae. Thus, there is no motivation in Akinari et al. to try to make the composition of the present invention.

As Applicant pointed out in the Amendment dated August 13, 2004, the composition comprising benzetonium chloride and PVA (polyvinyl alcohol), which is used in the example in Akinari et al., is inferior to the preparation comprising cetylpyridinium chloride and PVA in the aspect of the long time sustained-release effect. This may be seen from the Experimental Example 1 and Fig. 1 in the present invention, namely, the results of preparation Examples 5, 6, 10 and 12, which are the composition comprising benzetonium chloride and PVA.

In response, the Examiner has stated that Fig. 1 does not support the above argument. Applicant submits that Examiner's opinion is based on Example 2, because the preparation comprising PVA and cetylpyridinium chloride in Example 2 of the present invention does not maintain the effect for 6 months. However, Applicant respectfully submits that the preparation in Example 2 is not directly comparable to other preparations in Examples 1 and 3-12.

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That is, the preparation in Example 2 (preparation 2) is used for showing the long time sustained-release effect even if the preparation has a pellet type shape. The preparation 2 was prepared in less volume than the other preparations, because the preparation 2 is cut after molding into the plate. Actually, the weight of cetyl pyridinium chloride in the preparation 2 is 45g, and this is half or less as compared with weight of biocides in other preparations (100-300g). The concentration of the biocide in the preparation 2 is 23%, and this is also lower than other preparations. In the volume of the preparation, other preparations' volumes are 18750mm<sup>3</sup>, while the volume of the preparation 2 is 300mm<sup>3</sup>, and so this value is about one-sixtieth the other. Thus, since the volume of the preparation and weight of biocide (cetylpyridinium chloride) in the preparation 2 is lower than other preparations, it is natural that the sustained-release time would be shortened. Therefore it is improper to regard the preparation 2 as a shorter sustained-release preparation.

For summary purposes, Applicant here shows a table relating the biocides, substrates for sustained -releasing, other ingredients and solvents, shapes of preparations, volume of preparations and concentration of biocides in preparations, for the preparations in the specification.

Example	Biocides (Weight)	Substrates for sustained-releasing (Weight)	Other ingredients (Weight)	Solvents (Weight)	Shapes of preparations	Volume of preparations	concentration of biocides in preparations
1	CPC (100g)	PVA(200g)	EDTA2Na(1g)	water (460g)	cylindrical	18750 mm <sup>3</sup>	33%
2	CPC (45g)	PVA(150g)	EDTA2Na(1.5g)	water (803.5g)	pellet	300 mm <sup>3</sup>	23%
3	CPC (100g)	PVA(300g)	EDTA2Na(1g), denatured alcohol(300g)	water (300g)	cylindrical	18750 mm <sup>3</sup>	25%
4	CPC (100g)	PDS-MAM(100g)*	EDTA2Na(1g)	acetone (1000g)	cylindrical	18750 mm <sup>3</sup>	50%
5	benzalconium chloride(200g)	PVA(200g)	EDTA2Na(1g)	water (360g)	cylindrical	18750 mm <sup>3</sup>	50%
6	benzalconium chloride(100g)	PVA(200g)	EDTA2Na(1g)	water (460g)	cylindrical	18750 mm <sup>3</sup>	33%
7	trichlorohydroxydiphenyl ether (100g)	PVA(200g)		water (460g)	cylindrical	18750 mm <sup>3</sup>	33%
8	CPC(100g)	PVA(300g)		water (480g)	cylindrical	18750 mm <sup>3</sup>	25%
9	CPC(100g)	PVA(300g)	denatured alcohol(300g)	water (300g)	cylindrical	18750 mm <sup>3</sup>	25%
10	benzalconium chloride(200g)	PVA(200g)		water (360g)	cylindrical	18750 mm <sup>3</sup>	50%
11	benzalconium chloride(100g)	PVA(200g)		water (460g)	cylindrical	18750 mm <sup>3</sup>	33%
12	trichlorohydroxydiphenyl ether (100g)	PVA(200g)		water (460g)	cylindrical	18750 mm <sup>3</sup>	33%

\*: polydimethylsiloxane-methyl methacrylate block polymer

: can not sustained-release for 8 month.

The Examiner also stated that Vaughn et al. discloses cetylpyridinium chloride as a biocide and PVA copolymer as a substrate for sustained-releasing, and the sustained-releasing composition in Vaughn has long time sustained-releasing efficiency. However, the biocide in Vaughn et al. has the following characteristics: "The cationic biocidal agents which are capable of being ionically bonded with the copolymers of the invention to form the biocidal particles and fibers include ... cetylpyridinium halide [i.e., cetylpyridinium chloride] ...." (column 2, line 59, to column 3, line 10). That is, the biocide (biocidal agent) is ionically bonded by the substrate for sustained-releasing (the polymer) (column 2, lines 18-23). Thus, the composition in the present invention, in which a biocide

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and a substrate for sustained-releasing are kneaded with each other and the biocide is fixed **physically** (not ionically) in the substrate for sustained-releasing, is clearly different from the composition in Vaughn in which the biocide is ionically fixed in the substrate. Since Vaughn et al. does not disclose the effect of the composition in which a biocide is physically fixed in a substrate for sustained-releasing, there is no motivation that the biocide is physically fixed to PVA type polymer; namely, there is no motivation in Vaughn for the present claims.

Cardarelli discloses a sustained-releasing polymer containing biocide, but there is neither disclosure nor suggestion for use of a composition comprising PVA type polymer as a substrate for sustained-releasing and cetylpyridinium chloride as a biocide, nor any suggestion as to what effect a composition comprising PVA type polymer and cetylpyridinium chloride would have.

Applicant therefore submits that claims 1, 4, 8, 14, 22 and 28-29 are novel and non-obvious over Akinari et al. (JP 11-246309), Cardarelli (U.S. Patent No. 4,400,374) and Vaughn et al. (U.S. Patent No. 5,006,267), taken separately or in combination.

**Claims 1, 4, 8, 15, 18, 22 and 28-29 are rejected under 35 U.S.C. §103(a) as being unpatentable over Vaughn et al. (U.S. Patent 5,006,267) in view of Cardarelli (U.S. Patent No. 4,400,374).**

As disclosed above, a biocide is **ionically** bonded in a substrate for sustained-releasing in Vaughn et al.; thus, the composition in Vaughn et al. is clearly different from the composition in the present invention in which a biocide is physically fixed in a substrate for sustained-releasing.

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Cardarelli discloses neither that PVA type polymer is used as a substrate for sustained-releasing nor that cetylpyridinium chloride is used as a biocide.

Therefore, there is no motivation in the description of Vaughn et al. and Cardarelli to use a composition comprising PVA type polymer and cetylpyridinium chloride.

Claims 1, 4, 8, 15, 18, 22 and 28-29 are therefore novel and non-obvious over Vaughn et al. (U.S. Patent 5,006,267) and Cardarelli (U.S. Patent No. 4,400,374), taken separately or in combination.

In view of the aforementioned remarks, the claims are in condition for allowance, which action, at an early date, is requested.

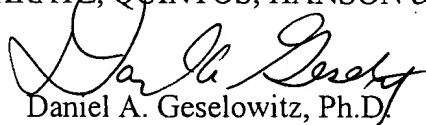
If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact Applicant's undersigned agent at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

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In the event that this paper is not timely filed, Applicant respectfully petitions for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

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